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ABSTRACT

This document contains four papers from a symposium on adult learning in the workplace. The first paper, "Measuring Critical Thinking: Is There a Single Instrument?" (Patricia K. Leitsch, Carol A. Lentz), examines two issues: the relationship between tests measuring critical thinking and those measuring readiness for self-directed learning and the question of whether the Self-Directed Learning Readiness Scale measures the construct of critical thinking. Three interventions based on a new approach to training are described outlined in "Combining Constructivism and Andragogy in Computer Software Training (Albert K. Wiswell, Sarah Ward). "Learning to Learn in the Workplace" (Gene L. Roth) examines the following topics: building awareness of self-as-learner, creating active learners in the workplace, expanding the worker's repertoire of learning strategies, helping workers compensate for learning deficiencies, increasing self-monitoring and reflection by workers, and facilitating learning how to learn in the workplace. The validity of the propositions that individual adults want to have control over their learning and that learning increases when adults have such control is explored and challenged in "The Locus of Control in the Adult Learning Planning Process: A Research Agenda" (Richard A. Swanson, Tom Gamble, Joanne Provo, Teresa Tillson). (MN)

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8 **Adult Learning in the Workplace**

Chair: Margaret Lohman, University of Iowa

Measuring Critical Thinking: Is There A Single Instrument?
Patricia K. Leitsch, University of Louisville
Carol A. Lentz, University of Louisville

Combining Constructivism and Andragogy in Computer Software Training
Albert K. Wiswell, Virginia Polytechnic Institute & State University
Sarah Ward, Information Analysis Inc.

Learning to Learn in the Workplace
Gene L. Roth, Northern Illinois University

The Locus of Control in the Adult Learning Process: A Research Agenda
Richard A. Swanson, University of Minnesota
Joanne Provo, University of Minnesota
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Measuring Critical Thinking: Is There A Single Instrument?

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This study addresses two questions: What is the relationship between tests that measure critical thinking and those that measure readiness for self-directed learning; does the Self-Directed Learning Readiness Scale (SDLRS) measure the construct of critical thinking? A total of 277 undergraduates and graduates enrolled at an urban higher education institution took part in the study. Findings indicate there was no relationship, and the SDLRS does not appear to measure the construct critical thinking.

Two of the most often studied and debated constructs within the field of Adult Education are critical thinking and self-directed learning. To date, no consensus has been reached regarding an acceptable definition of either construct and agreement has not been reached regarding which measure of these constructs is best.

In 1953, Othanel Smith defined the term "critical thinking' as the process of reasonably deciding what to believe and do. Since that time, there have been many ways to define and explain critical thinking. Equating critical thinking to the development of logical reasoning abilities has been supported by Hallet (1984) and Ruggiero (1975). The notion that critical thinking is the development of intellectual ability has been supported by Meyers (1986) and Stice (1987). Critical thinking defined as a process and consisting of multiple steps was developed by Ennis in 1962. He identified twelve steps within the process along with the recognition that critical thinkers had abilities or capacities for progressing through the process.

In 1987, Brookfield identified critical thinking as a process consisting of four phases: 1) identification and challenging assumptions; 2) recognition of context in which assumptions are formed: 3) identification of alternative solutions; and, 4) acceptance of alternative solutions or "reflective skepticism"(p.9). Central to his definition of adult critical thinking is his belief that the adult critical thinker is responsive to his environment at work, at home and in social settings. These contexts provide the critical incident necessary to trigger the critical thinker to enter the critical thinking process.

Another direction for the definition of critical thinking follows more closely that of problem solving and was introduced in 1954 by Dressel and Mayhew. This model identified the following steps: the ability to define a problem, select pertinent information for the solution of a problem, recognize stated and unstated assumptions, formulate and select relevant hypotheses, and draw valid conclusions from inferences.

As stated initially, as with critical thinking, no consensus has been reached as to a single definition of the construct self-directed learning. The position, counter position and rebuttal of "what is self-directed" between Barry Vann and Anne Percival in the Summer, 1996 issue of Human Resource Development Quarterly aptly illustrates the difficulty in defining the term. In the literature, (Merriam & Caffarella, 1991) two distinct definitions of self-directed learning have emerged. Defining self-directed learning as the process an adult goes through in order to learn autonomously is considered a form of study. The second definition is one that defines self-directed learning as a personal characteristic or attribute that can be acquired and measured. For the purposes of this paper the construct, self-directed learning readiness embraces the definition as a personal attribute.

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The Problem

The skills needed for the work force in the year 2000 are critical thinking and self-directedness (Rosenberg, 1992). The instruments used to measure these skills are dependent upon the definition of each of these constructs and to date not one single measure of both skills or constructs has been developed. With the downsizing of corporate America, training and development specialists would be best served if one test would measure both traits.

Two measures of problem solving and critical thinking that appear to be reliable and valid are the Cornell Critical Thinking Tests (CCTT) and the Watson-Glaser Critical Thinking Appraisal (WGCTA). Studies conducted utilizing either the CCTT or WGCTA can be placed into three categories (McMillian, 1987): 1.The creation and validation of the instruments to measure the construct critical thinking, 2.The variation in levels of critical thinking abilities depending on types of majors, courses, age, gender, race, and educational levels of individuals being tested, and 3.The acquisition of critical thinking skills resulting from some type of classroom intervention.

To date, researchers have the choice of two instruments to measure the construct self-directed learning: Guglielmino and Associates' Self-Directed Learning Readiness Scale (SDLRS) and the Oddi Continuing Learning Inventory (OCLI). Oddi (1986) measures the concept of self-directed continuing learning, while the SDLRS (1977) measures the internal state of psychological readiness to undertake self-directed learning activities. Guglielmino's (1977) scale was selected for this study because the SDLRS is based upon the assumption that readiness depends upon eight factors or attributes of self-directed learners: openness to learning, self-concept as an effective learner, initiative and independence in learning, informed acceptance of responsibility, love of learning, creativity, future orientation, and the ability to use basic study and problem-solving skills. The last factor is implied within the SDLRS but not directly measured.

Research Questions

This study investigated the relationship between the two currently used measures of critical thinking, the CCTT and WGCTA and a measure of self-directed learning readiness, the SDLRS. The CCTT and WGCTA both measure the construct critical thinking as a process. The CCTT is based upon Ennis' (1962) twelve aspects of critical thinking while the WGCTA is based upon Dressel and Mayhew's (1954) five step problem solving model. Both the CCTT and WGCTA conceptual foundations fit into Brookfield's (1987) definition of adult critical thinking. The WGCTA-Form S (1994) was developed to enhance its ability in assessing adults, specifically within the context of work. The scenarios and language were up-date to reflect current practice.

The SDLRS has been subjected to factor analysis with the previously mentioned eight factors identified (Guglielmino, 1977): openness to learning, self-concept as an effective learner, initiative and independence in learning, informed acceptance of responsibility, love of learning, creativity, future orientation, and the ability to use basic study and problem-solving skills. The SDLRS was developed to measure traits associated with the readiness and abilities required for an adult to be a self-directed learner. Since the CCTT and WGCTA measure abilities to problem solve, or think critically, and the SDLRS measures abilities to create, orient on the future, and problem solve, a possible overlap of measures of problem solving might exist.

Therefore, if it can be shown that the SDLRS does in fact measure problem solving and critical thinking abilities, then it is possible that this one instrument could be used rather than having to use the SDLRS in conjunction with one of the tests of critical thinking, the CCTT or WGCTA. Two research questions were addressed. What is the relationship between tests that measure critical thinking and those that measure readiness for self-directed learning? Does the SDLRS measure critical thinking/problem solving by implication?

Methodology

Critical thinking was measured using the CCTT-Z and WGCTA-S. The CCTT-Z, Third Edition (1985) is a 52 multiple choice item questionnaire. The test includes measures of induction, deduction, observation, credibility, assumptions, and meaning. Reliability estimates for the CCTT-Z range from .50 to .77 using split half measures. The CCTT-Z correlates with other tests that attempt to measure critical thinking at the .05 level, with a range of .25 to .79. Correlations with scholastic aptitude tests range from .36 to .71. The CCTT-Z correlates moderately with graduate school success. The completion time is not more than fifty minutes. The normative data for the CCTT-Z (Ennis, Millman & Tomko, 1985) identified a mean range from 25.6 to 39.2 with standard deviations ranging between 4.4 to 5.7. The norm samples ranged from 10th grade education through graduate school.

The WGCTA-S (Watson-Glaser, 1994) was developed from the Watson-Glaser Critical Thinking Appraisal Forms A and B, specifically for assessment of adults in the workforce. The WGCTA-S is composed of 16 scenarios, 40 test items and is completed in approximately 30 minutes. The WGCTA-S results are reported in both the total raw score and the five subtest scores: 1) Inference; 2) Recognition of assumptions; 3) Deduction; 4) Interpretation; and, 5) Evaluation of Arguments. The reliability of the WGCTA-S ranged from a Cronbach's alpa coefficient of .90 to .69 for various occupations. Test-retest scores at two week intervals for the WGCTA-S correlated at .81 ($p<.001$). Part-whole correlations of Form S and A, based upon a sample of 3,727, ranged from .89 to .97. The means and standard deviations for Form S were derived from the normative sample used for Form A, using equivalent raw scores from Form S. WGCTA-S means range from 31.48 to 33.99 with standard deviations between 4.21 to 5.20. To date, no studies have been identified utilizing the new Form S.

The SDLRS was developed in 1977 by Lucy Guglielmino. The SDLRS contains 58 items with a five point Likert scale rating from almost never true of me to almost always true of me. Seventeen items are worded in reverse thus requiring a change in weights prior to scoring. The total score is then calculated. The completion time is approximately 20 to 25 minutes. The reliability estimate of the SDLRS is split-half Perarson product moment correlation with Spear-Brown correction is .91 based upon a sample of 3,151 (Guglielmino, 1995). Convergent validity studies of the SDLRS has provided apparently conflicting results. Caffarella and Caffarella (1986) report no change in SDLRS scores for students in a self-directed class. Kasworm (1982) reports significant increases in SDLRS scores as a result of self-directed instruction. The results of the construct validity of the SDLRS indicate a positive correlations to ratings of self-directed behaviors and total SDLRS scores (Finestone, 1986; Guglielmino & Guglielmino, 1988; and Roberts, 1986) The Guglielmino & Associates' *Test Manual* (1995) list the mean for the SDLRS as 214 with a standard deviation of 25.59 for an adult population.

Demographic data collected include age, race, gender, program of study, and highest grade completed. Results of studies utilizing either the CCTT-Z , WGCTA-S, or SDRLS have reported results indicating the effects of these demographic variables on total scores. Generally, middle aged, white, males with higher levels of education score higher on measures of critical thinking. Recent studies (Denney, 1995) report a decline in critical thinking ability in the older adult population. Different types of academic preparation have been shown to affect total critical thinking scores. Programs that require reflective thinking have shown an increase in both the CCTT and WGCTA-A scores. The SDLRS score has been affected by age and gender.

The sample for this study consisted of students enrolled at an urban institution of higher education in the Southeast. The students were undergraduates enrolled in allied health, teacher preparation, sports administration, physical education, exercise physiology, and training & development programs. Three classes of graduate students in training & development were included.

Data Collection

Informed consents were signed prior to data collection. The students who volunteered to participate were randomly assigned one of three instruments to complete first, either the CCTT, WGCTA or SDLRS. Data were collected over a period of one to two weeks to maintain the integrity of the CCTT and WGCTA. Demographic date were collected on the answer sheet of the standardized critical thinking instruments.

All data were entered into a data screen created in an *Access* program. The file data was exported into *SPSS 6.1* for statistical analysis. Descriptive statistics and the Pearson-product correlations were calculated.

Demographic variables Table 1 presents the frequencies for the nominal variables. The total sample consisted of 277 students, 141 or 50.9% female, coded 0, and 136 or 49.1% male coded 1. The sample contained 244 or 88.1% whites coded 1, 31 or 11.2% African-Americans coded 2, and 2 others coded 3. The highest grade completed ranged from high school graduate to completion of a doctorate. The majority, 43% of the sample, had completed two years of college.

Table 1

Frequencies and Percentages of Demographic Characteristics of Sample

Variable	Value	Frequency	Percent
Race			
White	1.00	244	88.1
Black	2.00	31	11.2
Other	3.00	2	.7
Gender			
Female	.00	141	50.9
Male	1.00	136	49.1
Highest Grade	12.00000	12	4.3
Completed	13.00000	9	3.2
	14.00000	58	20.9
	15.00000	68	24.5
	16.00000	119	43.0
	17.00000	10	3.6
	18.00000	1	.4

Table 2 presents the descriptive statistics for all the ordinal data. The average age of the sample was 28.73 with a standardad deviation of 7.52 and a range of 18.03 to 55.99. Not all students completed all three standardized instruments. The mean score of the 181 students that completed the SDLRS was 226.57, standard deviation of 22.36 and a minimum of 159 to a maximum of 288. Two hundred and seventy five students completed the WGCTA-S and had a mean score of 26.20, standard deviation of 6.15, with a range of 11 to 40. One hundred and ninety completed the CCTT-Z, and the mean was 26.20 with a standard deviation of 5.36 and a range of 16 to 41.

Table 2

Means, Standard Deviations, Ranges for Age, SDLRS Scores, WGCTA Scores, and CCTT Scores

Variable	Mean	Student Development	Minimum	Maximum
Age	28.73	7.72	18.03	55.99
SDLRS	226.57	22.36	159.00	288.00
WGCTA	26.20	6.15	11.00	40.00
CCTT	27.36	5.36	16.00	41.00

Data Analysis

The Pearson correlation coefficients were calculated for the demographic variables and the total scores of the CCTT-Z, WGCTA-A, and SDLRS, Table 3. Of the 181 students who completed the SDLRS and the WGCTA-S there was no relationship established between the two measures. The SDLRS and CCTT-Z were not related for the 129 students in the sample.

Additional analyses were conducted to explore the lack of relationship between the SDLRS and the two measures of critical thinking, the WGCTA and CCTT. Table 3 presents the correlation coefficients for each of the three measures and the demographic variables. The SDRLS has been shown to correlate to age, and in this sample there is a slight correlation to age of .2221 at p=.003. The WGCTA was positively correlated to age, gender, and highest grade completed. A negative correlation was found between race and WGCTA. In previous studies, the WGCTA has been correlated to older, white, males that had higher levels of formal education. This sample exhibited a similiar relationship to the WGCTA. The sample's CCTT was correlated to highest grade completed which is consistent with other findings.

Table 3

Pearson Product Correlation Coefficients of Demographic Characteristics and the SDLRS, WGCTA and CCTT Scores

Variable	SDLRS	WGCTA	CCTT
Age	.2221 (181) p= .003	.2196 (275) p= .000	.0396 (190) P= .587
Race	.1071 (181) p= .151	-.1907 (275) p= .001	-.1261 (190) p= .083
Gender	-.1007 (181) p= .177	.1447 (275) p= .016	.1067 (190) p= .143
Highest	.0604 (181) p= .419	.2231 (275) p= .000	.1501 (190) p= .039
SDLRS	1.0000 (181) p= .	.0786 (181) p= .293	.1378 (129) p= .119

The sample's means of the SDLRS, WGCTA and CCTT were compared to the normative means by one-sample t-tests, Table 4. The SDLRS normative sample means was 214 (Guglielmino, 1995), and was significant at the .0001 level. The sample's mean was significantly higher than the norm's mean. The WGCTA mean of 31.48 (Watson-Glaser, 1994) represented the lowest mean for the norm sample, and was signigicant at the .0001 level. The sample had a statistically signigicant lower mean than the norm sample. The sample's CCTT mean was within the range of the normative mean.

Table 4

The Sample of Means for SDLRS and WGCTA Compared to Normal Sample

Variable	Number of Cases	Mean	SD	Test Value	T-Value	df	P=
SDLRS	181	222.5691	23.361	214.00	7.56	180	.0001
WGCTA	275	26.2000	6.145	31.48	-14.25	274	.0001

Conclusions

While this study failed to find a relationship between standard measures of critical thinking and self-directed learning readiness, the possibility still exists that one measure could identify both constructs. The results of this study were affected by the variation in means for the sample and the normative samples. Additional studies, using samples closer to the normative sample need to be conducted.

The results of this study indicate that the SDLRS does not appear to be measuring the construct problem-solving, when compared to standardized measures. Additional factorial analysis studies need to be conducted on the SDLRS to verify if the instrument is measuring problem-solving abilities.

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Combining Constructivism and Andragogy in Computer Software Training

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Changes in both microcomputer technology and the context in which it operates necessitate a new approach to training that incorporates constructivist and andragogical practices to deliver a more learner-centered experience. This articles describes three interventions that demonstrate how this can be achieved.

Computer software training is typically delivered in the instructor-centered modality. Objectives are predetermined, the method of training is didactic, and a demonstration is followed by "choral" guided practice recreating or slightly modifying the training example (Masie, 1996). This is understandable, given the typical goals of the training: learning sequential procedures for the most commonly-used features of off-the-shelf software. However, powerful changes are impacting the computer training industry: stabilization of GUI (graphical user interface) operating systems, migration towards common platform architecture, increasingly congruent software releases, and greater automation of complex tasks within programs (Furst-Bowe, 1996). For users, this standardization means having to learn fewer details of a particular software version with greater portability of skills between programs. User focus can switch from "getting the darn thing to run" to getting their work done—moving from operational to applied concerns. For organizations, this may result in fewer instructor-led classes as technology delivered instruction also improves (Rosenthal, 1996). A new generation of computer-based training (CBT) packages challenges the dominance of instructor-led training (ILT) with high-quality, interactive, inexpensive products (Buske, 1996). Reasonable prospects for future improvements in computer technology are voice-synthesized data input, organization-wide custom database design, cheap videoconferencing, and the creation of more powerful search engines—perhaps with artificial intelligence components and live interactivity as the "computer" asks questions to help refine or even redirect queries. All have the potential to impact computer software training *practices* as well as desktop use.

The typical way of doing computer training is destined for change, and not, we believe, simply to CBT (Simia, 1996). The present inclination to shift away from ILT provides the opportunity to re-examine how training is conducted (Gremmo and Abe, 1993). Further, here is a chance to consider approaches that have been used for more complex and higher-level learning outcomes (Knowles, 1980; Cross, 1981; Smith, 1993).

Conceptual Framework

Most computer software training is developed using an approach based on instructional systems design (ISD). Basically, the designer or instructional specialist determines learning needs (or performance gap), develops outcome objectives, and designs content to meet these objectives. Two other paradigms of learning are presented here in contrast to this approach because of their role in designing the interventions under study.

Andragogical Principles Andragogical principles of facilitating learning include the following premises:

- Adults learn what they value.
- Adults want to apply what they learn to their jobs.
- Adults bring rich, varied experiences to a learning activity.
- Adults can be self-directed in their learning when they have the capability.
- Adults benefit by utilizing their own learning styles and preferences.
- Adults can be responsible for their own learning.

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Constructivism Constructivist approaches to instructional design instruction provide a set of assumptions about how people learn:

- Knowledge is constructed uniquely by each person, a function of past experience and the interpretations formed by their minds.
- Learning is an active process of engaging and interacting with the environment.
- Effective facilitation involves engaging learners dynamically in their learning, so the knowledge they construct is useable in other contexts and new situations.
- Useful knowledge is derived from solving problems related to real-world practice situations.

Research Questions

The following questions guided the research activities reported here:

1. How can skills-based software training be delivered in a way that is more learner-centered in its content and context?
2. How can andragogical and constructivist approaches to instruction be incorporated into organization-wide computer skills training efforts?

Method

This was an *action research* study of training implementation at three federal agencies with the purpose of discovering solutions through solving real-world problems (Merriam and Simpson, 1995). Each setting had a mandate for a comprehensive, organization-wide training program for a particular training need, although the specific need was different in each organization. Each setting also had a unique set of learner needs to be addressed. The analysis in each case describes how these programs were implemented, identifies the obstacles encountered, explains how the obstacles were overcome, and discusses the manner in which theory was applied to practice. Each case then becomes an exemplar of how to implement a learner-centered approach to training, incorporating andragogical methods and constructivist theory.

Case 1 The Resolution Trust Corporation (RTC) was an organization (it closed its doors officially on December 31, 1995) trying to impart the freedom of self-directed learning to employees in lieu of ILT. By its charter, the RTC could not provide non-job related training to employees. This prevented any training for skills not immediately applicable to their curtailing jobs. For instance, RTC employees were never trained in Windows® — even though it was clear any subsequent employment would likely demand knowledge of that operating environment. To assist in job hunting without violating this precept, the RTC offered Internet classes in job-related activities, and then announced that as part of the specific number of hours per month employees were allotted to pursue a new job, they could use their ILT-derived Internet skills to search and apply for new positions.

Under this implementation, workers were given general classroom-based training and expected to obtain specific application skills through their own learning. Given the relatively low level of computer user sophistication within the RTC, there was concern that employees would become frustrated with the new, cumbersome Internet and their use for both work and job hunting would be small. Also, employees were unaccustomed to directing their own learning. Two essential organization elements were provided to minimize these obstacles: *information* (Human Resources provided a supplemental brochure on how to use the Internet for job hunting), and *support* for its use (time from normal duties, supervisory backing, and technical assistance from the Help Desk). With their personal sense of urgency, learners broke from the spoon-feed-me stance and tackled the technology with determination. They aggressively sought knowledge, and solved problems of sources, connection, Internet-based e-mail, downloading files, and printing quickly. Their high value of the information and clear perception of its immediate, personal application proved an ideal medium for the adoption of constructivist and andragogical approaches. Further, once the Internet job-hunting guide was well-circulated, fewer Internet training classes were scheduled as informal learning

replaced formal learning of necessary skills. Employees expanded their use of the Internet in job-related activities as well, with more people using the Internet in more complex ways than had been anticipated. This combined constructivist and andragogical approach not only permitted an innovative job-hunting tactic but contributed, in part, to the early closing of the training center.

Case 2 At the Federal Deposit Insurance Corporation (FDIC), an enormous reduction-in-force is shrinking the organization 19,000 to 4,500 over two years. Workers are facing new tasks with new tools and no time or budget for instructor-led training. (It would take approximately three years to provide the present 9,000 employees through comparable ILT given the available facilities). The project manager in charge of training has been experimenting with constructivist approaches to microcomputer training and designing new means of delivering training *assistance* to learners. This would support transitioning from instructor-led to self-directed learning.

Again, the intervention would work within the existing ILT medium to incorporate andragogical and constructivist practices. Within this organization is a history of "top-down" directed training and a sense of disenfranchisement by learners. In addition, initial efforts to utilize computer-based training (CBT) have not been well-received. For instance, people re-shuffled into the organization from another agency were expected to teach themselves the Windows® environment through a network-based tutorial delivered to their desktop. Although a good product, users resisted the approach and came to the ILT for specific applications unprepared. There was no means of proving users participated in the CBT program, and instructors were confronted with individuals who either claim to have taken the tutorial when they had not, or had taken it so long before or learned so little from it, that they might as well not have done so. This compounds the task for instructors by adding a separate set of learning needs to the class. Tension is created for the workers who have not received classroom training in Windows®, and resentment rises among Windows®-fluent users who feel their training time is ill-used addressing issues outside the class topics. (Keep in mind that these workers are competing for the same diminishing number of positions.)

Applying adult learning practices within ILT yielded two important remedies: 1) it began the transfer of responsibility for learning to the learners themselves, and 2) it provided a supported learning environment where mistakes could be made, analyzed, and correct procedures discovered *without* encouraging competitiveness. For example, instead of having the topics to be studied dictated, learners participated in determining their own curriculum from a preset list. Within the classroom setting, a contract was agreed upon between instructor and learner to cover the portions of training most salient to their job. Additional topics, which may or may not have been on the original list, were covered as time permitted. The instructor may have performed the skill for a group or the whole class, or facilitated learners working in groups or individually. As proof of understanding, the learner may have demonstrated the new skill to the instructor, group, or class; or the learner depended on self-evaluation to determine when satisfactory learning had taken place.

Allowing learners to tailor learning to their needs enhanced the value they place on what they learn, directed learning to be relevant to their work, provided concurrence that the method of learning was comfortable, and promoted the selection of a measurement and demonstration process for their success in learning congruent with their learning styles. This approach was well-received by learners and new options for learning facilitation are being considered. Part-time open learning laboratories, "sneaker-based" or "short-order" training by telephone, deskside coaching by appointment, and increased accountability by learners for their learning achievement are all being reviewed for inclusion in a new generation of computer training. Through the combined approach, the shift from passive to active learning and accepting responsibility for one's own learning is underway.

Case 3 The Patent & Trademark Office (PTO) is in pursuit of *integrated* patent searching capability through the Global Patent Information (GPI) Project. As part of that project, prototype interfaces to existing and developing databases from around the world are produced. The final products will save patent examiners hours of time and increase the validity of patent application acceptance and rejection. Currently, examiners have limited access to training due to facility and financial restrictions. Training has been intensive classroom initiation with occasional follow-on sessions covering new tools. PTO is investigating migrating to more technology-delivered instruction, particularly as it relates to desktop-delivered training.

As the GPI interfaces are experimental, training costs for explaining the prototypes to volunteer patent examiners must be minimal, as well as the disruption to their normal work duties. Short turn around times for training development, on-going changes to the interfaces, and alterations based on user feedback combine to challenge training design and delivery. Budgetary restrictions and the evolution of integrated applications and platforms further extend the opportunity to redefine training tools and delivery, and for andragogical and constructivist modifications. Examiners' expressed need for more training has been emphasized in focus group sessions . Along with their strong desire for more training, the nature of their work demands a high level of autonomy and self-directed problem solving, making them good candidates for a combined constructivist, andragogical learning approach. Meeting these needs requires approaching the problem from several fronts. First, an experimental process for training delivery itself has been devised: a non-authoring tool level CBT developer. This process has created an eight-part individualized training tutorial in HTML format that will be available through the PTO's local Intranet, PTOnet. Future tutorials can be created and updated at a fraction of the usual cost. Additional user support required for this training is being identified through interactions with end users (the learners) via focus groups, hyperlinked e-mail, and telephoning a separate, technical help desk. Extending the technology-delivered instruction through ample learner support is valued by management as well as users. As the final interface is decided, a full-fledged, interactive CBT program is planned, providing one of the first opportunities to evaluate its performance in the PTO environment as well as its efficacy in meeting learning goals. Desktop-delivered instruction, provided just-in-time, at learner-directed intervals on learner-selected topics, dovetails should dovetail neatly with the independent work practices of employees.

Findings

Learning was found to occur in an almost endless variety of ways. Three dimensions in particular appeared to describe important characteristics to each variety of learning: content, context, and control.

Dimensions of Learning Modes Each dimension has relevance for the incorporation of andragogical and constructivist features. See Figure 1.

Content. The content dimension describes the focus of what is to be learned ranging from general computer technology skills and competencies to solving particular work-based problems and applications.

Context. The context dimension describes the setting in which the learning occurs. This ranges from group settings in a typical training room or computer laboratory to settings in which the learning is totally individualized at the learner's workstation.

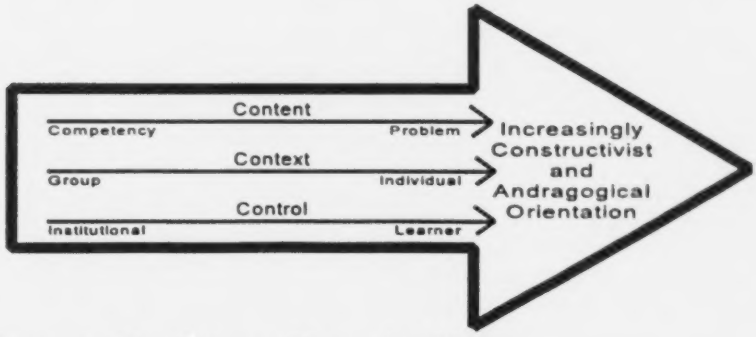

Figure 1. Dimensions of Learning Modes

Control. The third dimension, control, refers to who specifically decides what is to be learned. In more traditional training, control is in the purview of the trainer, the curriculum developer or the person elsewhere in the organization responsible for assessing needs and deciding what learning is most useful for people to be exposed to. At the other end of the dimension, the locus of control is in the hands of the learner who decides on an individual basis what he or she wants to learn, when, and how.

Use of Organizational Resources There are three major categories of learning activities based on increasing involvement of organizational resources. At the low end of resource utilization are various self-help activities. Next are various avenues of automated help which connect the learner to resources beyond their immediate workstation area. The third level involves direct assistance by an expert technician or trainer and perhaps require organizational facilities as well. See Figure 2.

Self-help Learning Activities. These activities all occur at or near the individual's workstation and do not require network resources or contributions from training or technical personnel. These include using the on-line help, wizards, coaches, and tutorials built into the application software. Also included are paper-based materials such as user manuals provided with the software or other materials provided by the training department such as deskside job aids designed for summarizing and/or detailing how to accomplish particular tasks. Lastly, self-help refers to approaching a co-worker or peer or formally- or informally-identified SMEs (Subject Matter Experts).

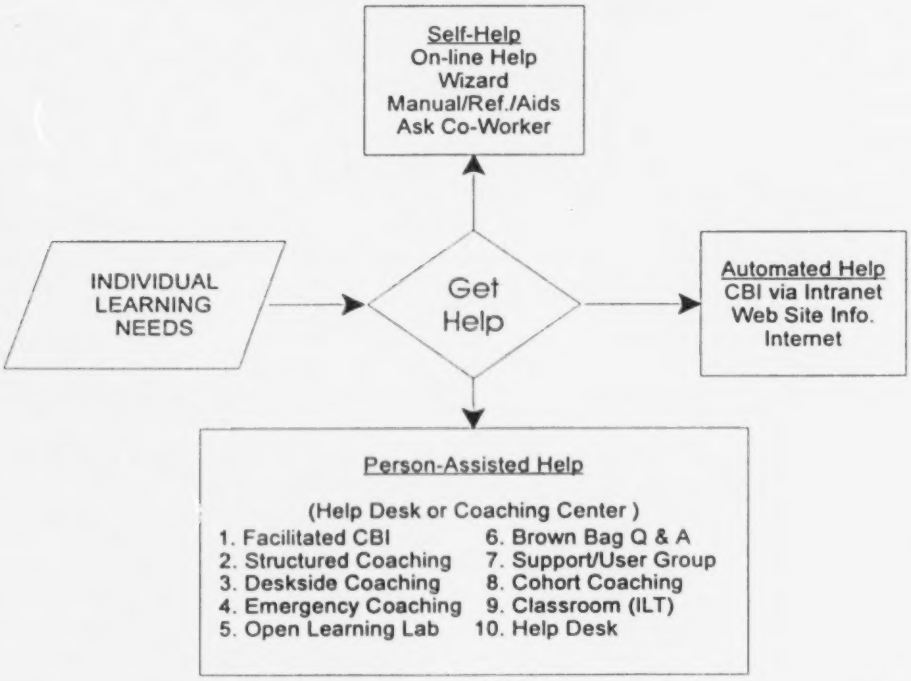

Figure 2. Use of Organizational Resources

Automated Learning Activities. Automation here refers to desktop-delivered formal or informal computer-based training. The focus of most automated help is general competency rather than solving particular problems of applications. This category includes network- or intranet-based resources, or searchable information housed on the Internet. (There may be licenses or fees required for some information access.) An intranet, or an organization-specific computer network which

replicates the easy browsing features of the Internet, will be increasingly called upon to host training resources. Some of the materials available will be CBI programs, job aids, on-line manuals, "tips and tricks," feature updates, use guidelines including cases of problems solved, and classroom registration.

Person-assisted Learning Activities. When an individual contracts training or technical staff for direct intervention they are engaged in a person-assisted learning activity. The focus of this type of activity is originally learner-directed but may be dimensionalized from learner-directed to instructor-directed in operation. The first line of interaction is generally the help desk. Help desks are often outsourced and the level of knowledge available varies greatly. Working with help desk personnel may shift the focus from delivering step-by-step problem resolution to transferring knowledge for future application. Depending on the nature of the problem and the skills of the personnel (both learner and instructor), control for how much actual learning is available is in the hands of the instructor or technician. In the second tier of person-assisted learning, there is direct involvement with a person as learning facilitator. The range of interactions includes facilitated CBT or using CBT in a traditional classroom setting with an instructor available to support the learner, structured coaching or classroom-based coaching sessions held in response to specific topical requests for learning received by the help desk, deskside coaching or one-on-one coaching conducted at the learner's workstation by appointment, emergency or immediate coaching (within two hours following the request, for example) to solve an application problem, open learning laboratories where, at regular intervals, an instructor is available to oversee walk-in, self-directed topical learning, brown bag question-and-answer sessions where an instructor or organizational SME presents use tips and responds to learner inquiries, support/user groups for learners who augment learning through discussion of problems and solutions, and cohort coaching sessions where learners with like learning styles and needs meet as a group to collaboratively solve problems and gain knowledge. Traditional classroom or ILT also falls within this category.

Recommendations

HRD Practice There are strong advantages to this approach. Incorporating learners into the design and delivery of training frees resources to be applied in higher-order contexts for a better return on the training investment.

First, depending on the size of the organization, outsourcing the help desk may reduce both cost and administrative effort substantially. Specifically, large, nationally-based technical support staff operations *improve* the quality of service as opposed to what happens when best-price criteria are the basis for contract award. These help desk personnel can potentially become as familiar with the organization as on-site personnel who also operate, and provide intervention, virtually. Wise outsourcing of the help desk can free HRD personnel from administrative duties and funds for improving training programs.

Second, by restructuring the help system to include automated services, the individual receives greater service *at their workstation.* This results in less disruption of work and greater receptivity to the comprehensive approach to software migration and training efforts. Providing just-in-time training at the desktop for learner-determined duration are the highly rated elements of training for end users.

Third, the juxtaposition of several kinds of coaching and support modalities increases the chances of meeting individual learner needs in concert with their personalities and learning styles. This range of service is desirable to demonstrate the commitment of the organization to supporting the user during learning. Investing in the individual according to his or her preferences yields higher returns on training dollars by providing more appropriate, better-utilized training. Building the employable skills of a person helps them feel better able to perform their job tasks. It also reduces anxiety about being readily employable outside the organization, in anticipation of the FDIC's additional planned reductions in force. The variable approach to meeting training needs is the best tactic to meet the organization's learning goals.

Meeting Learner Needs Meeting learner needs can be accomplished through a variety of vehicles. A Coaching Center can be established. Upon determining their need for learning, the

individual contacts the Coaching Center Coordinator who provides initial guidance to on- and off-line services and support. The Coordinator will assist the learner in determining which service is most appropriate to their situation. Two broad categories of help are available: coaching services and follow-up information and support services.

Coaching Services Needs of a general nature will be referred to the Facilitated CBT conducted in a classroom. Special topics will be booked into the next Structured Coaching course on a particular topic. (Help Desk logs and the records of the Coordinator will be coalesced to justify scheduling Structured Coaching courses.) Deskside Coaching, under this premise, will be scheduled by appointment allowing greater service with fewer coaching resources. For users in immediate need of assistance, Emergency Coaching will be available within two hours of the received request. The cornerstone of limiting this more expensive form of training (almost the equivalent of a Personal Trainer) will be that each learner is limited to a specific number of Emergency Coaching sessions within an agreed upon time period such as two per month for each of the first three months. This both limits the costs and deters abuse of this learning mechanism.

Follow-up and Support Services An often overlooked source of learning is the *Open Learning Laboratory*. At certain times, a classroom will be available for "drop in" individual and collaborative learning facilitation. Depending on the numbers of users, an office may be set up for small training labs (up to 6 users) in other buildings. This small laboratory would preferably be adjacent to the coaches' office so that they could provide over-the-shoulder assistance or attend to other duties as needed. This arrangement would contribute to the development of the informal, supported learning community atmosphere.

Brown Bag Question and Answer Sessions could be offered regularly (monthly or bi-weekly). In an auditorium setting, participants would be free to ask questions of one of the coaches while enjoying a simple lunch provided by the organization. Contributions from the audience would be encouraged. Special guest *power users* from within the organization could be featured and the results from a weekly contest for the Best User Tip presented. The winning tip would be posted on the Training Home Page. The Brown Bag Q&A emphasizes the on-going support aspect of the transition, and creates a positive environment for discussing topics in a group format.

Following the Brown Bag Q&A, a Support/User Group would be offered for up to an hour. This would continue any discussion of developments and experiences in the focus-group style. The empathy and rich exchange of ideas and experiences can be cathartic for users feeling overwhelmed or disenfranchised. It can also be the launch point for informal or formal User Groups to meet with or without facilitation during and *after* the contract. Internal User Groups can offset the costs of expanding training programs as knowledge demands increase. They assure the topicality of discussions and the applicability of suggestions.

Lastly, for some learners, the individual learning approach is compounded by expressed or internalized feelings of alienation from the mechanized processes of computers. To foment the positive attitude necessary to achieve the organization goals for these users, a supportive, collaborative learning approach is wise. The *Cohort Coaching* medium is reserved for those users identified by frequent requests for low-level assistance who have not met performance criteria or outright asked for additional, personal instruction. From grade school to graduate school, cohort groups have produced remarkable improvements in learning outcomes for learners whose predilection is outside the targeted area of study. Cohort groups might benefit from more basic instruction in computers and their use before moving into the new software applications. Essential to this instruction is a building of self-esteem and self-confidence in the use of computers and realization of their service to the individual in terms of doing their job. The criticality of imparting the *value* of this undertaking cannot be overemphasized. For the Cohort Coaching candidate, instruction will best work of a particularly *personal* nature. These learners often identify intensely with their instructor, and it is this relationship that promulgates further learning.

Cohort Coaching is an alternative to the more expensive Deskside or Emergency Coaching options. The user is given the environment for supported learning in the learner-centered, constructivist style, and can improve less-than-enthusiastic attitudes and minimal skills. Cohort Coaching affords the organization the chance to attend to often long-term underutilization of

investments in software and hardware, and the accompanying thwarted productivity goals. It is an powerful component in the building of a learning community, reaching out in very human terms to users — an important element in responding to those who decry "dehumanizing" the learning process through CBT. *Both* are part of the total learning picture.

Summary

This article invites readers to consider combining constructivist and andragogical practices in the modern design of computer training. Examination of successful practices from other fields and theories will cultivate training approaches that serve higher-order learner needs with better fit and smoother function. Organizations will likely redirect training programs to applied use rather than basic operation of computer programs. Technical trainers may need to be retrained in facilitation skills as the content area of computer usage incorporates increasingly learner-centered and problem-focused orientations.

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Learning to Learn in the Workplace

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The HRD community can benefit from a discussion of the relationship of learning how to learn and workplace learning. This paper examines topics such as: building awareness of self-as-learner, creating active learners in the workplace, expanding the worker's repertoire of learning strategies, helping workers compensate for learning deficiencies, increasing self-monitoring and reflection by workers, and facilitating learning how to learn in the workplace.

The refrain is often heard from supervisors and managers in the workplace. They state "We need workers who are flexible, adaptable, and are good communicators. We need people who are quick to learn and people who can solve problems in ambiguous and vague situations. We need people who know how to learn."

Several years have passed since the American Society for Training and Development sponsored a major study that examined the workplace basics that employers seek from workers. The most essential skill of workers identified in the study was learning how to learn (Carnevale, Gainer, and Meltzer, 1990). This key skill underpins individual learning, team learning and organizational learning in the workplace.

The late Robert M. Smith, more so than any other scholar, brought to our attention the notion that people are unfinished products as learners. From his vantage point, all learners have room for improvement. He described LHTL as an umbrella concept that can be construed as a goal, process, or area of inquiry (Smith, 1990). As a goal, he described it as a means to become more effective as a learner -- regardless of the context that one encounters. As a process, he explained that LHTL processes and activities can be adopted, practiced, and refined by one's self or through the facilitation of others. And as an area of inquiry, he acknowledged the expanding literature base related to LHTL and the need to inform practitioners and policy makers of its significance.

The purpose of this paper is to focus on select components of learning to learn and note recent developments. This paper will examine LHTL as a means of helping workers become more efficient and effective as learners in the workplace. Although it is beyond the purpose of this paper to provide an exhaustive analysis of the LHTL concept, several components will be emphasized:

- Enhancing workers' awareness of "self-as-learner"
- Helping workers become active and assertive learners
- Expanding workers repertoires of learning strategies
- Self-monitoring and reflecting by workers/learners
- Facilitating learning to learn in the workplace
- Creating a supportive learning environment in the workplace

Workers and Their Awareness of Self-As-Learner

The workplace is a hectic environment. Workers in the United States are combatting a variety of stresses and strains that have been brought on by the chaos of their work settings: downsizing/acquisitions/mergers, new technologies, global markets, total quality movements, and so forth. A worker's time is becoming more and more important as a commodity -- especially when it comes to learning in the workplace. Speed, depth and breadth of learning in the workplace are vital issues regarding how knowledge is put to work in an organization (Redding & Catalanello, 1994).

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Building awareness of self as learner is central to learning to learn. Self awareness requires people to step back from the learning processes and take stock of the situation. Self-questioning is a requisite skill for building awareness of self as learner. Workers need to develop a critical eye to detect tacit attitudes, knowledge, and/or behaviors that impede their learning prowess. A helicopter view of learning in the workplace can be prompted by questions such as:

- How am I going about this?
- What seems to be working well?
- Which learning strategies seem to have little utility for me?
- Which alternative strategies might be most effective?
- Which strategies hold the greatest probability of success -- given what I know about the easy or difficult nature of this task?
- What can I predict as an outcome of this?

Reflecting on past learning experiences helps individuals tease out undetected characteristics of themselves as learners. Workers often have set patterns for learning in the workplace. Personal reflection can break down calcified learning habits and patterns. For example, writing a personal learning history is reflective activity that can help individuals critique their prior learning situations. A learning history can be a response to the following types of questions:

- Why am I this type of learner?
- Which past learning experiences have been the most powerful for me?
- What were the characteristics of those experiences?
- Why were some learning experiences easy and effortless?
- Why have other learning situations in the workplace been uncomfortable?

A personal learning history helps track the evolution of a learner. It helps the worker figure out why he/she is "that way" when it comes to learning certain types of tasks or learning under certain types of conditions at work.

Workers as Active and Assertive Learners

Active learners are pioneers and discoverers in the vast territory of learning how to learn. They doggedly seek out the mysteries of their personal learning. Active learners creatively look at a workplace learning situation and ask: What might work best here? How should I react to this milieu? How should I respond to this new information? What can I glean from similar situations? Active learners pay keen attention to the here and now and the subtleties of the work situation. They are aware of the tools that are at their disposal for specific learning tasks at work, and they are responsive to the changing nature of the situation. They seek out idiosyncrasies of learning situations as well as their personal reactions to them, and they store mental notes for the future. They are likely to ask: What inferences can I draw from this that will help me the next time I face a similar situation? What schema or typology can help me mentally classify this experience for recall?

Whereas under-developed and immature learners are more likely to be passive and less efficient in learning situations (De Corte, 1990b), active learners tend to be fluent with several learning strategies and are versatile with their applications. Active learners are more likely to experiment with new learning strategies and take risks. Because of their inquiring dispositions, active learners self-monitor and self-evaluate their progress. For example, active learners assess ways to be taught and select those most conducive to their learning needs. Other strategies include critiquing the systemic processes of their self-directed learning, and seeking feedback from others regarding their effectiveness in collaborative learning. They seek ways to "lubricate learning." That is, they scrutinize learning situations for solutions that might decrease the friction of personal learning processes and overcome their inertia. If they are stumped by a learning situation, they are able to pull back from it, and contemplate alternative paths.

Expanding the Worker's Repertoire of Learning Strategies

People increase their efficiency and effectiveness as learners in the workplace when they can apply a full array of learning skills, strategies, and tools. Learners need to be adaptive to diverse learning contexts at work. Strategic learners can recognize the demands of a learning situation and inventory probable remedies. They have identified and refined deliberate tactics that can be employed for effectiveness and efficiency (Reynolds and Wade, 1986). These metacognitive strategies allow workers to be adaptive and flexible in learning situations.

On the other hand, some individuals are paralyzed in certain contexts because of their narrow band of learning strategies. There is an old expression, "When you only have a hammer, the whole world looks like a nail." The expression implies that one's world-view is delimited by personal resources. If you only have a hammer, then you will probably use it in every possible situation, regardless of the fit between the tool and the task.

In like fashion, if individuals rely on merely a few learning strategies in the workplace, then they are likely to over-use them and apply them in inappropriate situations. Furthermore, certain learning contexts are likely to be avoided by ill-equipped learners. They may consider their existing learning strategies to be impotent against the risks and peculiar aspects of an ambitious learning task.

When workers are proficient with a variety of learning strategies, they are better able to cope with personal learning blind spots, hindrances, and learning deficiencies. Learning strategies can be used as mental prostheses that can prop-up the learner against the demands of the learning task. They permit people to take stock of the actions that embellish their learning in a variety of situations in the workplace, whether or not the situation is tedious, risky, solitary, confrontational, mundane or collaborative.

Workers with a broad array of learning strategies use techniques such as rehearsing before a learning event; anticipating elements of the learning event based on prior experience and knowledge; and considering courses of action, potential outcomes, and respective implications. Learners with these skills have developed an advanced arsenal and a sophisticated system for deploying learning tools and strategies. Using metacognitive strategies as an example, Schmitt and Newby (1986) describe this self-regulatory process as "...checking and evaluating to determine whether the task matches preconceived notions about it, whether selected strategies are working, whether task performance is adequate, or whether comprehension is proceeding as it should." (30) In other words, the worker can dissect the elements of the learning situation and take corrective action as it unfolds.

Self-Monitoring and Reflection by Workers/Learners

Building the competence of workers as learners requires alertness to the processes of learning. People can "keep tabs" of the processes by self-questioning, monitoring, and regulating their learning in the workplace. A system of executive thinking must emerge that questions the parameters of learning in the workplace: Why is this difficult for me? What factors are at play right now? How does this compare to my expectations? What inferences can I make about these results? How do I justify this response? Self-questioning allows workers to scrutinize their learning processes as they occur and creates a critical consciousness of the processes: What are the underlying assumptions here? Why I am I not getting this? Why is this always difficult for me? How can I enhance this reflective experience?

Reflection and self-monitoring link together the senses of feeling and thinking. People face emotional issues as well as cognitive issues when they acquire new information (Shepard and Fasco, 1994) The assemblage of beliefs that helps learners navigate their work environments has been put together from personal experience. This personal reality has shaped the uniqueness of the individual. Learning how to learn includes taking stock of one's personal experience and monitoring the effects of emotions on learning processes. Workers carry around a lot of baggage in the workplace. They must be able to recognize their "hot buttons" and assess the repercussions on their desired learning outcomes.

Facilitating Learning to Learn in the Workplace

Facilitating LHTL includes helping workers become aware of their habits as learners. This includes examining the root causes of learning habits, critiquing their validity, and devising new strategies worthy of experimentation and testing. These functions are not automatically applied by most people in formal learning situations. However, Armour-Thomas and Allen (1993) noted that competence can be gained in LHTL if awareness and use of processes are explicitly encouraged and reinforced through facilitation. Practice benefits LHTL.

How might people begin to reflect on their learning in the workplace? Reflective writing can be used as a facilitation strategy for workers. Reflection-learning journals and autobiographies can help workers critique and examine their learning processes. Reflective writing can extend learning in the workplace. Reflecting on experience as a learner helps one to recognize the genesis of his/her idiosyncrasies of learning (Shepard and Fasco, 1994). Surfacing these habits allows one to analyze and make adjustments as a learner. The journaling process can "prime the pump" and generate a flow of consciousness for people who are struggling to capture the essence of their learning. Facilitators can respond to reflective journals by providing alternative ideas, metaphors, comparative actions, and other constructive recommendations.

Not all adults will benefit from creating reflective journals, particularly those who struggle with the process of writing. Furthermore, some workplaces and/or work assignments might not be conducive to reflective writing. However, the reflective process need not result in the written word. Harri-Augstein and Thomas (1983) endorsed the "learning conversation" as a reflective process for the learner -- a technique of conversing with oneself about the processes of learning. They noted that learners can talk through their processes of attributing meaning to learning encounters:

> Most people are almost totally unaware of how they attribute personal meaning to the displays of public knowledge offered to them in lectures, laboratories, seminars, and work places. Reading, listening, talking, writing, thinking, feeling, judging, deciding, and doing are long established habits that have become so fixed and unavailable to conscious review that learners are almost entirely prisoners of their rigid competencies. (39)

For many adult workers, beliefs about themselves as learners rest in sub-conscious levels of the brain. Seeing one's reflective thoughts through the eyes of another person can be a catalyst for learning to learn. Talking through their learning processes with another person in the workplace can help learners uncover underlying beliefs and assumptions that they hold about themselves as learners (Shepard and Fasco, 1994).

Learners respond to elements of a learning situation according to their field dependency or field independency. The learning climate of the workplace may enhance or delimit the effectiveness of the worker/learner. For example, some workers might be receptive to guidance and direction in work related learning. In contrast, other learners will cherish their independence as learners. Joughin (1992) listed four learner characteristics that are worth noting here for their transferability to workplace learning:

> *Structure*: Learners can be expected to vary according to their need for external structure, their response to provided structure, and their ability to create structure where none is provided.
> *Analytical ability*: Learners should be expected to show marked differences in their ability to master situations in which either the content of learning or the structure/process of the learning situation calls for a high level of analytical ability.
> *Responsiveness to affective considerations*: Learners will vary in their need for supportive environments, in their capacity to use relationships with fellow learners and facilitators, and in their ability to learn from social or interpersonal situations.
> *Authority/responsibility*: Learners should be expected to show varying responses to authority in terms of their readiness to attribute authority to others, their comfort or discomfort in the face of authority, and their willingness and ability to accept personal responsibility for their learning. (13)

The Workplace as a Supportive Learning Environment

De Corte (1990a) maintained that powerful learning environments typically combine a balance of discovery learning and personal exploration on the one hand, and systematic facilitation and guidance on the other. Individual differences in abilities, needs and motivation of workers as learners must be considered in the balance. Supportive learning environments should contain authentic activities that provide insight about the processes of learning to both the learner and his/her mentor or facilitator.

The feasibility of creating a supportive learning environment in the workplace is enhanced when leaders acknowledge the centrality of learning to the mission of the organization. A learning-centered system may be premised on the following four points (O'Banion, 1995-6):

> Learning is a process that is lifelong for everyone and should be examined in a consistent, ongoing manner that is focused on improvement.
> Everyone is an active learner and teacher through collaboration, shared responsibility, and mutual respect.
> The learning process includes the external environment through the development of alliances, relationships, and opportunities for mutual benefit.
> Learning occurs in flexible and appropriate settings (21)

Watkins and Marsick (1993) stated that workers -- regardless of their levels of formal education -- will probably need help in learning how to learn. Skills in learning how to learn are typically not taught in formal learning settings, although people often assume otherwise. Workers need opportunities and guidance in refining their skills at learning how to learn in the workplace -- and such opportunities can be integrated in the workplace through a variety of informal and formal learning activities.

Concluding Thoughts

Learning to learn is an umbrella concept that subsumes topics such as metacognition and metacognitive strategies, learning styles, awareness of self as learner, learning contexts and a host of other issues related to improving the effectiveness and efficiency of learning. Learning to learn can be viewed as a goal, process, and area of inquiry (Smith, 1982). It is a vitally important skill for workers who seek to grow and develop as flexible, adaptive, and lifelong learners.

How does one become proficient in learning to learn? How does one gain competence as a learner in the varied contexts of the workplace? This paper stressed the importance of skill building by the worker/learner and facilitation by coaches and mentors in the workplace. For the individual learner, skills and processes such as self-awareness, self-monitoring, reflection, and active learning were highlighted. For the workplace facilitator, building supportive learning environments and providing ample practice opportunities for workers were recommended.

This writer believes there is something bigger than the previously mentioned processes and skills that engender learning to learn. It is something holistic and it encompasses the ways that learners approach learning situations with people, things and ideas in the workplace. The more one examines the theory and practice of learning to learn, the more one senses that it exalts a unique world-view that is premised on the power of learning.

When people embrace the concept of learning to learn, they observe and interpret phenomena with a heightened consciousness. Their learning processes are the target of personal critique and continuous improvement. For these learners, merely seeking expected outcomes from learning is not good enough. The processes of learning are scrutinized: Can I be better at this? Why is this a struggle? What might work here? Although perfection as a learner is never achieved, when one becomes accomplished in learning to learn, the world never appears the same.

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The Locus of Control in the Adult Learning Planning Process: A Research Agenda

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Adult learning is defined as the process of adults gaining knowledge and expertise based on their personal goals. The general strategy of this paper, and the full monograph version to be developed in the following phase, is to explore and challenge the validity of one of the most popular ideas in adult learning: That individuals want to have control over their learning and that learning increases as a result. Just what do we really know from the research about this core idea of learners controlling their own learning process?

The Premise of Individuals Controlling their Own Learning

One of the most popular ideas in adult learning is that individuals want to have control over their learning and that learning increases as a result. The purpose of this paper is to highlight a literature study and research agenda aimed at investigating the validity of these ideas.

The adult learning thesis is that better outcomes result from adult learning when the learner retains the locus of control throughout the learning phases. The research questions pursued in this paper are: (1) What do we really know from the research about this core idea of learners controlling their own learning process, and how does it play out in practice? And, (2) after reviewing the research in terms of scholarly theory and proven practice, what researchable questions arise?

Cervero and Wilson help set the stage for the discussion in their book, *Planning Responsibly for Adult Education: A Guide to Negotiating Power and Interests (1994).* They note that the literature has been "focused on technical, 'how to' skills, while presupposing some ideally neutral staging area in which these skills will be exercised, and have remained surprisingly silent on the troublesome issues of "what for" and "for whom." They go on to speak more forcefully– "Which people get to decide the purpose, content, and format of the program? Is it always the people with the most power? Is it the adults who will participate in the program, the leadership of the institution sponsoring the program, or the planners themselves?" (Cervero & Wilson, 1994, xii).

The idealism surrounding the concept of adult learners controlling their own learning is most widely attributed to Malcolm Knowles (1975). His book, *Self-Directed Learning: A Guide for Learners and Teachers*, is considered a classic in education. Knowles (1980) states that, "adult educators must primarily be concerned with providing the resources and support for self-directed inquiry" (p. 19). Regarding his concept of the learner, Knowles further states that, "it is a normal aspect of the process of maturation for a person to move from dependency toward increasing self-directedness, but at different rates for different people and in different dimensions of life. Teachers have a responsibility to encourage and nurture this movement. Adults have a deep psychological need to be generally self-directing, although they may be dependent in particular temporary situations." (p. 43).

These ideas are seen as secondary by some in HRD as increasingly the focus is on the dependent variable of performance. Reaction to this focus is the concern that the feelings and worth of human beings as individuals are ignored by too much emphasis on bottom line results. Additionally, there is evidence that learning or the capacity to learn is a valuable outcome in and of itself and that sponsoring organizations logically benefit. Thus the line is sometimes drawn between those who view HRD as tied to business goals and focused on the bottom line and those who would like to take a more humanistic stance in the matter.

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At the larger perspective, nowhere has it been shown that organizational success is in direct conflict with employee happiness and well-being. And, it is difficult to find a contemporary article about HRD without at least some reference to linking HRD to the strategic goals of the organization (e.g., Gill, 1995). It has been argued that when adult learning decisions about individuals are bounded by rules and requirements of the organization, Adult Education (AE) becomes HRD, and that when the rules and requirements are located in the individual, it is AE. Thus, the core test is contained in the idea of locus of control. If the organization retains the authority to approve or disapprove learning interventions, the locus of control is with the organization and therefore it is HRD. To the point that they are overtly shared, they are both (Swanson & Arnold, 1997).

Strategy and Methodology

Adult learning is defined as the process of adults gaining knowledge and expertise based on their personal goals. The general strategy and methodology of this paper is to explore and challenge the validity of one of the most popular ideas in adult learning: The idea that individuals want to have control over their learning process and that learning increases as a result. Just what do we really know from the research about this core idea of learners controlling their own learning process?

The specific methodology of this paper is to provide a structure that parallels the learning planning process. The following figure, titled "Adult Learners Controlling their Learning Process," provides the framework of this investigation of the literature and the presentation of the following chapters. The outer ring, the ***Theoretical Foundation*** of adult learning envelopes the four phases of the adult learning planning process:

- ***Need*** - Determining what you need to learn so as to achieve your own goals.
- ***Create*** - Creating a strategy and resources to achieve the learning goal(s).
- ***Implement*** - Implementing the learning strategy and utilizing the learning resources.
- ***Evaluate*** - Assessing the attainment of the learning goal and the process of reaching it.

These five elements served as the categories or lenses used to search the research literature for what is and is not known about the locus of control as related to learners controlling their own learning process.

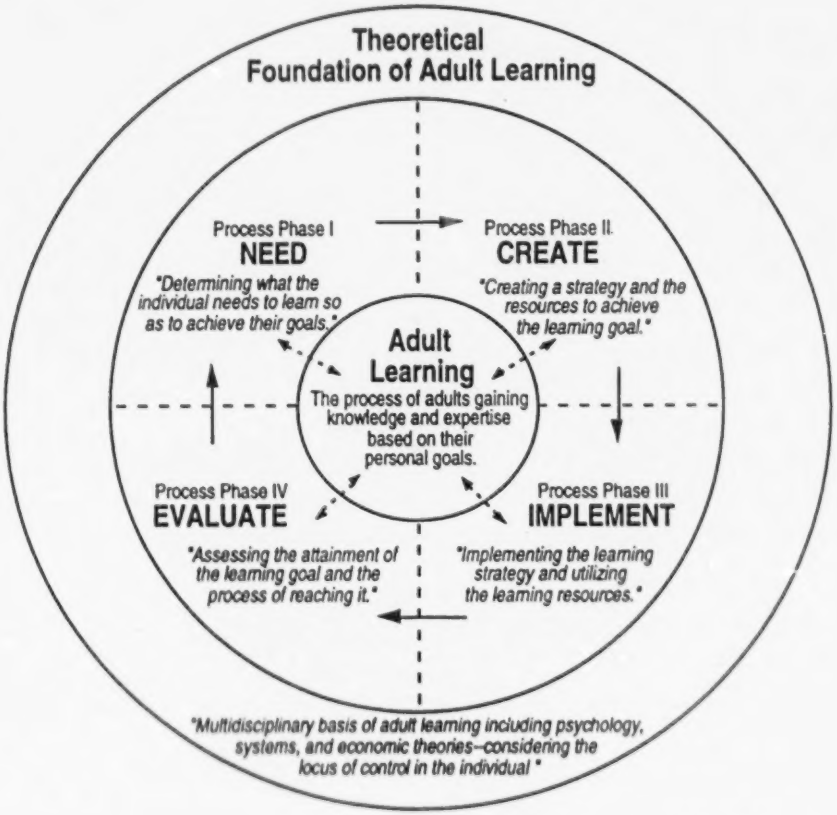
Theoretical Foundation

Learning is a process that has the potential for producing a change in an individual. Knowles (1980) emphasizes that the experience of the learner is the central dynamic to the learning process, with the experience defined as the interaction between individuals and their environment. He further theorizes that learning is an internal process, and those learning experiences which involve the individual in self-directed inquiry will produce the greatest learning. It is in the understanding of how individuals acquire knowledge and learn that learning orientations have emerged. The three orientations being reviewed here-- behaviorist, cognitive, and humanistic-- are not meant to be a comprehensive summary of the literature in this area or an attempt to posit any particular orientation. These orientations are discussed as a means of developing a deeper understanding of the learning theories that have emerged from these orientations.

Behaviorist Orientation. The behaviorist orientation to learning has been well documented and rests on a number of researchers, including Watson, Skinner, and Thorndike. Of these, Skinner is most often recognized as being responsible for developing behaviorism as a theory of learning, primarily for his work with operant conditioning. The key to this concept is the reinforcement of behaviors and the belief that if behavior is positively reinforced, the likelihood that that behavior will be repeated is increased.

In behaviorism, three underlying assumptions about the process of learning are held to be true: (a) Observable behavior rather than internal thought process is the focus of study, learning is manifested by a change in behavior, (b) The environment shapes one's behavior, and (c) Principles of contiguity and reinforcement are central to explaining the learning process (Grippin & Peters, 1984).

Adult Learners Controlling their Learning Planning Process


Theoretical
Foundation of Adult Learning
Process Phase I
NEED
"Determining what the individual needs to learn so as to achieve their goals."
Process Phase II
CREATE
"Creating a strategy and the resources to achieve the learning goal."
Adult
Learning
The process of adults gaining knowledge and expertise based on their personal goals.
Process Phase IV
EVALUATE
"Assessing the attainment of the learning goal and the process of reaching it."
Process Phase III
IMPLEMENT
"Implementing the learning strategy and utilizing the learning resources."
"Multidisciplinary basis of adult learning including psychology, systems, and economic theories--considering the locus of control in the individual"

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The behaviorist approach to learning is found throughout educational practice. This is true of adult education delivery systems as well, where actions are rewarded based on the observation of an outward behavior. It is also found in organizational settings where training and development, as well are reward systems, are built around a behaviorist orientation.

Cognitive Orientation. While the behaviorist orientation to learning is focused on observable behavior, the focus of cognitive orientations is the internal mental process within the learner's control. The meaningfulness of the learning is also enhanced when it can be related to concepts which already exist in the person's cognitive structure (Merriam & Caffarella, 1991). The underlying principles of a cognitive orientation theorize that (a) individuals construct their own meaning from an experience, (b) cognitive meaning develops in interaction with the environment, and (c) prior experiences direct perception and thus limit learning (Grippin & Peters, 1984).

Cognitivists are interested in how the mind processes, stores, and retrieves information. Since the internal mental structures are key to this orientation, cognitivism becomes a key factor in the study of adult learning from a developmental perspective.

The role of the educator, according to cognitive theorists, is centered on the effective arranging of a sequence of problems that flow according to organic stages of development, as well as providing appropriate resources for the solving of these problems by the learner (Knowles, 1990).

Humanist Orientation. While behaviorist theories focus on observable behavior, and cognitive theories focus on internal mental processes, humanist theories consider learning from the perspectives of the human potential for growth. "Humanists refuse to accept the notion that behavior is predetermined by either the environment or one's subconscious" (Merriam & Caffarella, 1991, p. 132).

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The humanist learning orientation is based on the premise that people's perceptions are centered in experience, and that they have the freedom and responsibility to become what they are capable of becoming. It is this unlimited potential for growth and development which becomes the basis of humanist theory. The study of motivation and choice grounding humanist theory are the concepts which drive self-directed learning. The role of educators employing a humanistic orientation involves removing barriers and presenting opportunities for the learner to act to his or her full potential.

This summary of learning orientations provides a basis for discussing adult learning theory. Knowles (1990) presents the relationship between these orientations and learning theory by tying behaviorist orientations to training, cognitive orientations to teaching, and humanistic orientations to self-directed inquiry. While this construct may be beneficial for summarizing teaching models, it may be somewhat limiting in exploring a deeper understanding of the learning theories presented in this investigation. The learning orientation of these theories is heavily influenced by the humanistic models, but behaviorist and cognitive orientations are present as well.

Experiential Adult Learning Theories. The field of adult education is based on an interpretation of adult learning. Merriam (1993), reminds us that we do know quite a bit about adult learning, and research has identified (a) who is most likely to participate in formal learning activities, (b) why they do, and (c) when and where this learning is likely to take place. There is also an increased understanding of the informal and self-initiated learning in which adults engage. The study of the process of acquiring, processing, and utilizing this new knowledge has driven much of the writing and research on adult learning theory and practice.

Brookfield (1986) regards adult learning as "resulting from a transaction among adults in which experiences are interpreted, skills and knowledge acquired, and actions taken" (p. 4). The key to this definition and many others is that adult learning can not be restricted to formal adult education programs. Definitions that restrict adult education to only those programs delivered in organized or sponsored programs are missing the majority of the adult learning experiences. Houle (1992) more broadly purports that "all adults need to learn throughout their lives in order to develop their personal and social potentialities" (p. 317).

These definitions present a challenge to adult educators who need to be creative and innovative in developing skills within adults that allow them to capitalize on learning experiences throughout their lives. Educators must also be comfortable with the notion that much of the learning will take place outside of the classroom. It is this reality, and the notion of learner retained control, that grounds the experiential and self-directed learning theories presented below.

Experiential learning takes place though experience and doing. Kolb (1984) extends this definition to all learning by stating that, "learning is the process whereby knowledge is created through the transformation of experience" (p. 38). His definition offers several aspects to the learning process which provide the foundation for an understanding of experiential learning. By acknowledging that learning is a process, and that knowledge stems from transformation, we begin to understand the continuous process of learning that is implied from experiential learning. According to Kolb, adults acquire information through apprehension (immediate and direct contract with concrete experience) or through detached comprehension of abstract concepts. The transforming dimension describes how information is personalized either through intention (reflective observation) or extension (active experimentation).

Argyris and Schon (1978) extend the concept of experiential learning from the individual to the organization, noting that learning from experience is essential for both individual and organizational effectiveness. They maintain, however, that the key to this learning is an environment where personal values and organizational norms support actions that are based on internal commitment, free and informed choice, and valid information.

In organizations, experiential learning can often be seen in the form of action learning (Lewis & Williams, 1994). Action learning, which is based on the premise of action science is a process for resolving issues where history offers no solution. Real and concrete tasks are used as the vehicle for learning by individuals, groups, or organizations. Unlike traditional classroom-based experience, where the instructor presents a situation and structured methodologies for problem solving, experiential learning asks that individuals be responsible for defining the situation, determining alternative solutions, and finally implementing and being accountable for a course of action.

The Psychology of the Locus of Control. From psychology comes a related concept referred to as locus of control (Rotter, 1966; Rotter, 1990) Locus of control is when "people attribute the

cause or control of events to themselves or to an external environment. Those who ascribe control of events to themselves are said to have internal locus of control and are referred to as internals. People who attribute control to outside forces are said to have an external locus of control and are termed externals." (Spector, 1982).

Internals perceive greater control and actually seek situations in which control is possible (Kabanoff & O'Brien, 1980). When it comes to successfully performing a task requiring luck or skill, externals are more likely to choose luck and internals choose skill (Kahle, 1980).

There appears to be a relationship between locus of control and experience. *Internals shift from internal to external after failure, but externals do not shift from external to internal after success* (Anderson, 1977). Phares (1976) notes that internals exert greater control of their environment, exhibit better learning, seek new information more actively, and seem more concerned with information than with social demands of situations. Externals tend to be more nervous than internals (Archer, 1979).

"Locus of control is considered an important personality variable in organizational research and theory (Spector, 1982, p. 493). As such, it is believed to a stable trait, not easily changed.

Thus, basic psychological theory and research frames the paradox between (1) the adult learning ideal of individuals taking control of their learning and (2) the limitations of individuals in taking on that control in planning their own learning process. The following sections focus on reporting the research issues related to this paradox at the needs, creation and implementation, and evaluation phases.

Adult Learners Controlling the Assessment of their Own Learning Needs

"Who needs what, as defined by whom?" is a wonderful way to sum up the issues of needs assessment in relation to the construct of control. Pentland (1977) found that the top four reasons why adults chose to learn on their own were all related to wanting to retain control of the learning process. Needs assessment, the up-front commitment to learning, is the phase with the greatest amount of attention in the adult learning process. In sorting through the discussion, the following taxonomy of control is useful:

Type of Learning	Locus of Control
Unintended Learning	No control
Self-Directed Learning	Learner Controlled
Authority-Directed Learning	Authority Controlled (organization or individual)
Mediated Learning	Shared control between learner and external authority

Even from the needs perspective, the literature will often frame the discussion at an information or in-process level. Rossing and Long (1981) talk about adults accepting or rejecting information (presumably being presented by an authority source) based on their in-process assessment of need for the information or the consistency of the information with their bias. Thus, the level of analysis is at the traffic light level (go, caution, stop), versus a road map level of deciding to take a journey and the nature of the journey (Ohio or Texas by automobile or airplane).

Adult Learners Controlling the Creation and Implementation of their Own Learning

The relevant research literature related to learner control of the creation and implementation is scant. Most inferences must be made from related studies and from the mediated learning-- shared control between the learner and an external authority (usually the instructor).

For example, the effect of individual opinions about the content as learners participate directly in the learning process has been studied. The Spelman and Levy (1966) study related to powerlessness and the distorting impact on learning is quite interesting. In this study heavy smokers learned as much general medical knowledge as the non-smokers but learned significantly less about the relation to lung cancer than non-smokers.

Rosenblum and Darkenwald (1983) concluded from their experimental research that high motivation could lead to high satisfactions and achievement without participant planning involvement. If this was the case, one interpretation could be that involvement at the needs

assessment phase may be critical, and that similar learner involvement in the other phases is not that important.

Could it be that self-directed learning decisions as to content and method create high motivation, minimum growth, and high satisfaction? A counter question to the pursuit of adult interest as the basis of learning process decisions is to wonder if such involvement leads to comfort rather than growth.

Adult Learners Controlling the Evaluation of their Own Learning

Evaluation is defined as, "a systematic collection of evidence to determine if desired changes are taking place (Swanson, 1996, p. 26)." In thinking about adult learners controlling the evaluation of their own learning, it is critical to separate learning that they have controlled up to the evaluation phase from learning that has been controlled by others at the need, creation, and/or implementation phase.

Assuming the learner has retained and executed control to this stage, the learner should be asking the evaluation question, "What systematic collection of evidence needs to be carried out to determine of my desired changes took place?" The follow-up question is; "Based on the evidence collected, to what degree did the desired changes take place?" The questions are focused on learning outcomes, not the process of working toward the learning outcomes (formative evaluation).

The learning evaluation literature is careful about noting direct measures of outcomes versus proxy, or related, measures. For example, a direct measure of desired knowledge, skill, and/or attitude (K/S/A) learning outcome would require instrumentation to directly measure the change. An indirect measure of knowledge might be to ask oneself or a participant if they thought they learned a lot or how satisfied they were with their learning. Indirect measures have highly questionable validity. For example, participant self-ratings of learning are not related to actual learning (Dixon, 1990). Even though self-ratings are reliable (consistent), this consistency does not ensure related to validity or actual outcomes.

Thus, if the adult learner relies on *self-assessment* proxy measures of outcomes, they will most likely make false conclusions based on invalid data. Worse yet, if the adult learning professional, serving as a resource to the adult learning process, relies on even more indirect measures of perceptions and feelings about desired changes to have taken place, the problem is compounded. Examples of such highly questionable evaluation practices relying on secondary sources of perception data are reported in a recent adult education book (see Cervero & Wilson, 1994, p. 60-61, 86-87, 111-113).

The adult learner wanting to retain control over the evaluation process while gaining valid data will, in most instances, have to reach outside his or her internal reference to gain rational evaluation data. Obtaining direct measures of K/S/A from formal tests or expert judges would be the most likely alternatives. In many avocational realms of personal development, interest groups provide external measures of skill through competitive judging (e.g., car shows, stamp shows, dance competition). At a less threatening level, experts serving as mentors provide similar evaluation.

The humanistic side of the evaluation literature has had a resistance to summative, outcome evaluation. Instead, the formative evaluation view is that evaluation should be diagnostic and have the purpose of improving learning, rather than simply determining if the desired changes took place (Bloom, Hastings, & Madaus, 1967). As such, formative evaluation is displayed in the figure as the feedback and feed forward arrows between the various phases of learning. Again, the purpose is to increase learning.

A Proposed Research Agenda

Our preliminary efforts at reviewing the adult learning literature parallels the findings of Cipicchio (1992). Her extensive review of the literature culminated with the conclusion, "..that the adult learning research supported a limited number of theories and contained few systematic research efforts" (Cipicchio, 1992, p. 37). Exploring the gaps between expoused theories and knowledge obtained from research is the primary basis for the following proposed research agenda

related to adult learners controlling their learning. This agenda can be used for a more extensive review of existing research and for directing new research.

Needs Assessment

1. What are the best means for adult learners to self-assess valid learning needs?
2. Given the best means of self-assessing valid learning needs, what is the effect of the needs on phases II, III, and IV of the Learning Planning Process?

Creation and Implementation

1. What are the best means for adult learners to create and implement valid strategies for achieving their learning goals?
2. Given the best means of creating and implementing valid strategies, does their use confirm the utility of phases II and III and what is the effect on the level of learning in phase IV?

Evaluation

1. What are the best means for adult learners to conduct valid self-assessment of their learning?
2. Given the best means of valid self-assessment of learning, what are the effects of executing that self-assessment on the level of learning in phase IV?

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